



University of Guelph Research Park
150 Research Lane, Suite 105
Guelph, ON, N1G 4T2
226.706.8080 | www.novusenv.com

Date: June 13, 2014

To: Peter Jakovic
Tridel Corporation
4800 Dufferin St.
Toronto, ON M3H 5S9

Re: Preliminary Pedestrian Wind Review
36-60 McCaul St
Toronto, ON
Novus Project # 13-0061



Credit: Architects Alliance

Novus Team:

Microclimate Specialist:
Senior Microclimate Specialist:

Tahrana Lovlin, MAES, P.Eng.
Bill F. Waechter, C.E.T.

1.0 INTRODUCTION

Novus Environmental Inc. (Novus) was retained by Tridel Corporation to conduct a Preliminary Pedestrian Wind Review for the planned development located at 36-60 McCaul Street in Toronto, Ontario. This review is in support of a re-zoning application.

1.1 Existing Site

The subject property is located between McCaul Street to the east, Stephanie Street to the south, Grange Park to the west, and Grange Road to the north. The site is currently occupied by a parking lot, a three-storey building, and a one story building. An aerial view of the site and nearby surroundings is provided in **Figure 1**.

1.2 Proposed Development and Areas of Interest

The proposed development is a 14-storey mixed-use building (plus the mechanical penthouse). The development also includes a four-storey art gallery at the north end of the site. Development highlights include:

- Outdoor amenity space on the 12th floor;
- Primary residential entrance near the centre of the east facade;
- Three townhouse units with grade-level entrances on the south facade;
- Underground parking with entrances on the west facade.

Sidewalks, main entrances, transit stops and amenity areas are of most interest in this review. The site plan is shown in **Figure 2** and a roof plan, including the Level-12 exterior amenity space is included in **Figure 3**. Vertical scale is illustrated with the east elevation (**Figure 4**).



Figure 1: Aerial View of Development Site Area
Credit: Bing Maps

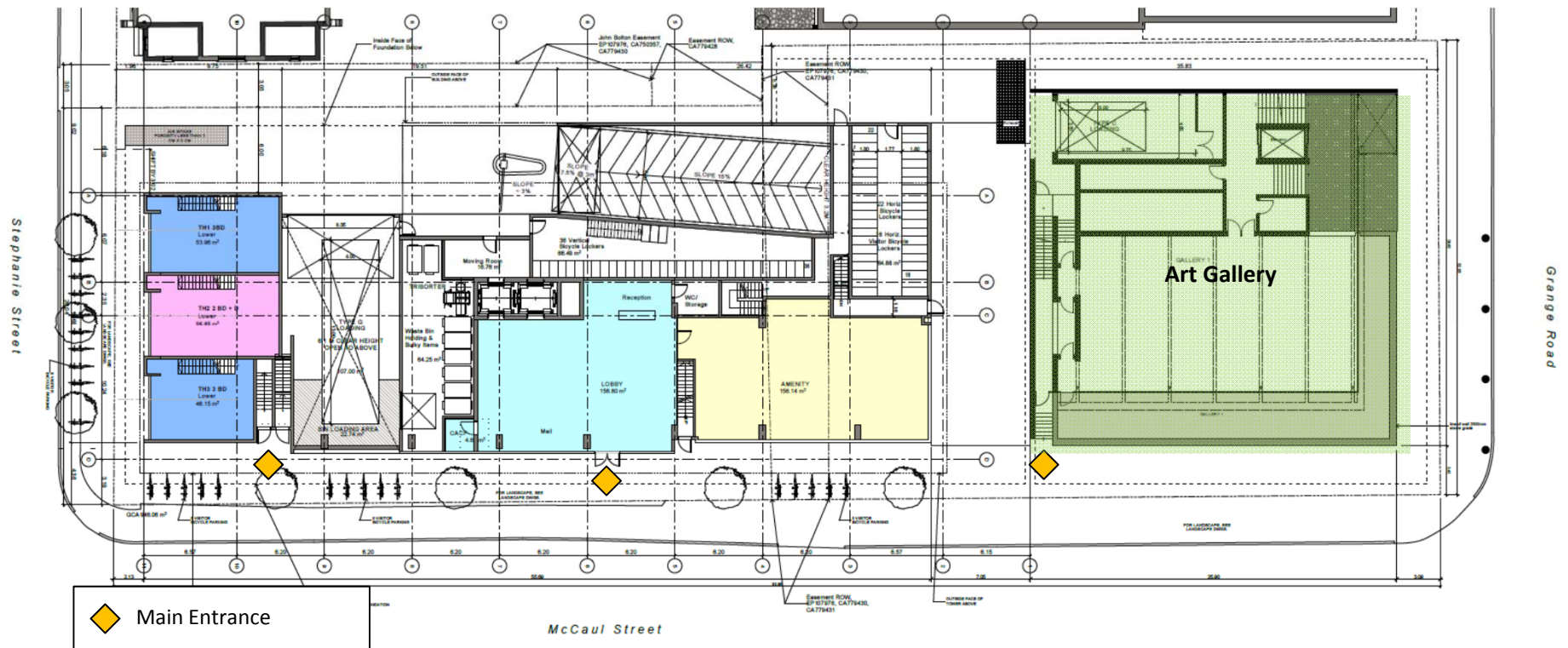


Figure 2: Site Plan
(Drawing A-1.03, June 12, 2014)

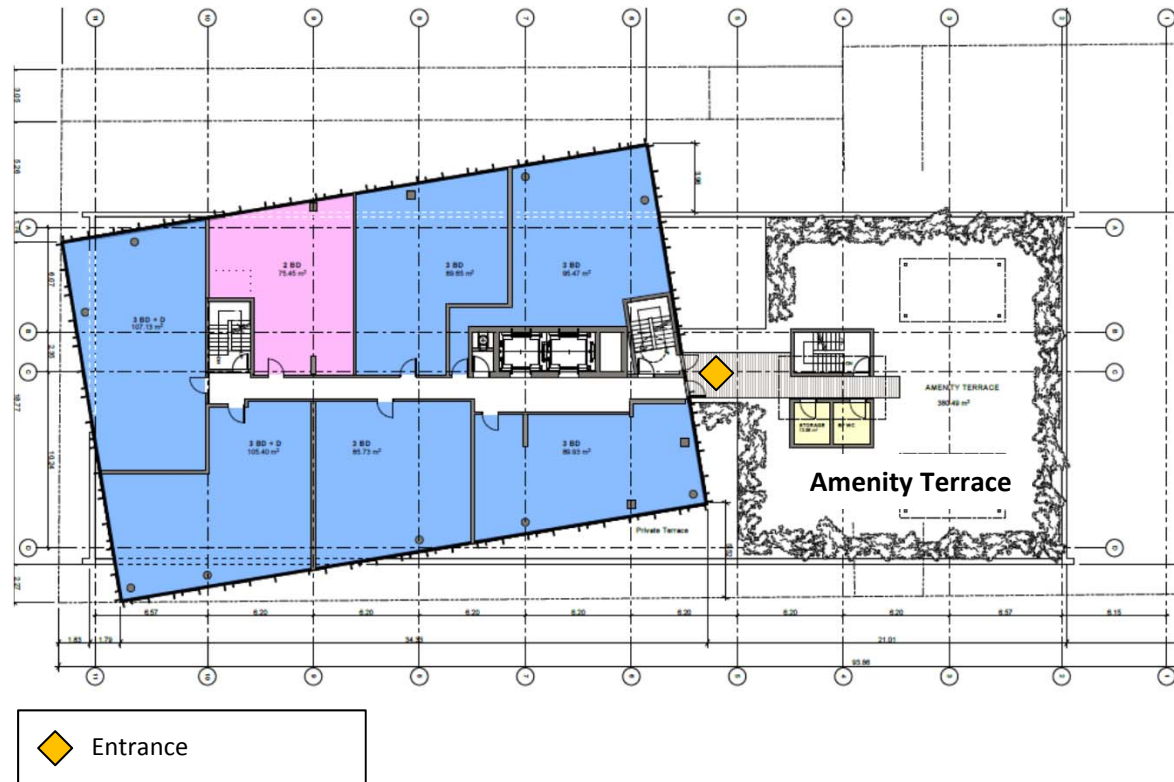


Figure 3: Level 12 – Exterior Amenity Terrace
(Drawing A-2.09, June 12, 2014)



Figure 4: East Elevation
(Drawing A-3.01, June 12, 2014)

2.0 APPROACH

A desktop analysis has been undertaken based on our extensive experience in estimating wind flow patterns around buildings, and using a knowledge-based expert system (KBES) developed by Novus. The analysis tool is based on published numerical models and methods, consistent with our experience in modelling wind flows through wind tunnel testing. This method provides a screening-level estimate of potential wind comfort conditions at the site, and assists with the initial selection of conceptual mitigation measures, where needed.

The current assessment is based on:

- The proposed project drawings dated June 12, 2014;
- A review of the existing wind climate in the area, through examining historical climate data (**Figure 5**);
- A desktop analysis of predicted pedestrian wind comfort resulting from the additional building; and,
- A comparison of the predictions against established comfort guidelines.

2.1 Pedestrian Wind Criteria

Wind comfort conditions are based on frequencies of predicted wind force, and are discussed in terms of being suitable for certain pedestrian activities such as Sitting, Standing, Leisurely Walking and Fast Walking. Although other parameters such as wind chill, humidity and exposure to direct sun, for example, may also affect pedestrian (thermal) comfort; these influences are not considered in the wind force criteria.

There are four categories for wind comfort. **Sitting:** Intended for cafes, terraces and other amenity spaces. These winds will rustle leaves and can be felt on the face. **Standing:** Intended for main entrances, transit stops and some outdoor amenity spaces; places where people tend to linger. These winds will disturb hair and cause leaves to move. **Leisurely Walking:** Intended for sidewalks and other areas pedestrians pass through; this may be difficult to achieve in regions with inherently high winter wind speeds. These winds will move small branches, disarrange hair and raise dust. **Fast Walking:** Intended for loading facilities, parking lots and other such infrequently used areas. At these wind speeds, trees in leaf being to move. The comfort criteria are based on certain predicted hourly mean wind speeds being exceeded 5% of the time; this is roughly equivalent to a wind event of several hours duration occurring about once per week. If fast walking cannot be achieved, the area is considered to have **Uncomfortable** wind conditions.

A criterion for wind safety is also reviewed and allows for several strong wind events on an annual basis. When too many strong wind events are predicted, wind mitigation measures are then advised, especially for frequently accessed areas.

The criteria for wind comfort and safety used in this assessment are based on those developed at the Boundary Layer Wind Tunnel Lab of the University of Western Ontario, together with building officials in London, England. They are based broadly on the Beaufort scale and on previous criteria that were originally developed by Davenport.

2.2 Wind Climate

Wind data recorded at Billy Bishop Toronto City Airport for the period of 1979 – 2009 were obtained and analysed to create a wind climate model for the four seasons. Annual and seasonal wind roses that illustrate the percentage of time wind blows from the 16 main compass directions are shown in **Figure 5**. Of main interest are the longest peaks that identify the most frequently occurring wind directions. The annual wind rose indicates that wind approaching from the east, east-northeast and from the west through southwest directions is most prevalent. The four seasonal wind roses readily show how the most prevalent winds shift direction during the year.

The directions from which stronger winds (e.g., > 30 km/h) approach are also of interest as they have the highest potential of creating problematic wind conditions, depending upon the building configurations and site exposure. The wind roses also identify the directional frequency of these stronger winds, as indicated in the figure's legend colour key. On an annual basis, strong winds occur most frequently from the west and west-southwest directions. All wind speeds and directions were included in the wind climate model.

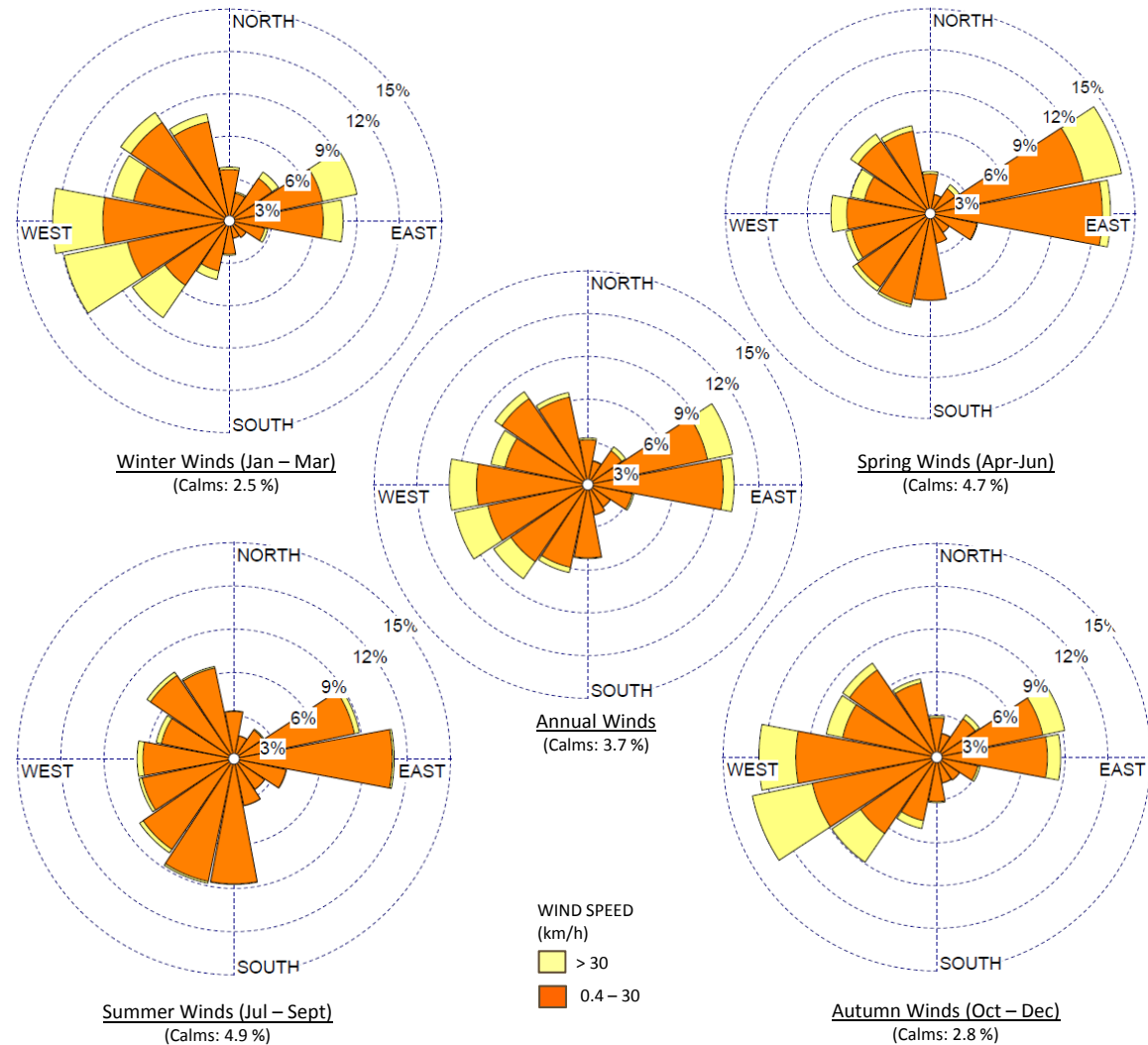


Figure 5: Season Wind Rose for Billy Bishop Toronto City Airport

3.0 RESULTS

Wind conditions at areas of interest were predicted using Novus' proprietary knowledge-based expert system (KBES) based on literature and on our extensive experience in predicting and understanding flows around buildings through wind tunnel testing. The results present a reasonable worst-case impact assessment of potential wind conditions at the site. Results are presented for the summer and winter seasons. A site plan of the development, for reference, is provided in **Figure 2**. It is important to note that the desktop analysis is of a screening-level nature, and considers only simplified, generic building massing.

3.1 Surrounding Areas

Overall, the desktop analysis indicated that existing wind conditions along McCaul Street would be predominantly suitable for sitting or standing throughout the year. These conditions were predicted for both the existing and proposed site conditions. Satisfactory wind conditions were predicted for the transit stops throughout the year.

On Grange Road, winds rated as comfortable for sitting and/or standing were predicted throughout the area for both the existing and proposed site configurations. During the winter, wind comfort levels ranged from sitting to leisurely walking for both site configurations. Winter winds shifted from sitting to leisurely walking near the proposed Art Gallery with the proposed development present; however, the comfort conditions are satisfactory and typical of other areas of Grange Road. Winds in Grange Park were predicted to remain comfortable for sitting in the summer, while winter winds remained as leisurely walking with the proposed development present.

Along Stephanie Street, summer winds were mainly suitable for sitting or standing. An increase in wind activity is expected south of the proposed development. Winds rated as leisurely walking or fast walking were predicted in this localized area during the winter. These wind conditions are considered satisfactory overall.

3.2 Building Entrances and Amenity Space

The main entrances to the proposed development are located along McCaul Street (see **Figure 2**). Wind conditions primarily comfortable for sitting or standing were predicted near these main entry points throughout the year. These conditions are appropriate for the main entrances.

An exterior amenity space is located on the 12th floor, on the north portion of the proposed building. The southern portion of the tower is three floors higher than the amenity terrace and provides a degree of wind shelter for southwest sector winds. As a result, wind conditions suitable for sitting and standing are expected on most of the amenity terrace, with winds rated for leisurely walking expected in more exposed portions of the terrace. Wintertime use of the terrace is not anticipated, and would require wind screening measures in the landscape plan if extended seasonal use is planned.

4.0 CONCLUSIONS AND RECOMMENDATIONS

A desktop analysis was conducted to estimate the wind comfort conditions associated with the proposed development at 36-60 McCaul Street in Toronto.

The study predicted that existing summer winds, rated as sitting and/or standing throughout the study area, will remain with the proposed development present. For select seating areas of the 12th floor exterior amenity terrace, wind control measures are recommended and should be considered prior to filing a site plan application.

During the winter, existing wind comfort levels ranged from sitting to leisurely walking along all streets bordering the development property. With the proposed development present, similar conditions were generally noted overall with some change predicted in a few areas. These include portions of the sidewalks around the Art Gallery (winds achieved leisurely walking), and also south of the proposed development on Stephanie Street. In this area, winter winds increased to leisurely walking and to fast walking in a limited area. Overall, the resultant wind comfort conditions are satisfactory.

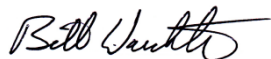
Wind comfort in Grange Park was not affected by the proposed development.

The wind safety criterion was predicted to be met with the proposed development present.

Should you have any questions or concerns, please do not hesitate to contact the undersigned.

Sincerely,

Novus Environmental Inc.



Bill F. Waechter, C.E.T.
Senior Specialist - Microclimate



Tahrana Lovlin, MAES, P.Eng.
Specialist - Microclimate

5.0 ASSESSMENT APPLICABILITY

This assessment provides a qualitative overview of the anticipated pedestrian wind comfort conditions on and surrounding the proposed development site. Subsequent alterations to the design may influence these findings and should therefore be reassessed.